CLAIMS

What is claimed is:

1. A method for passively aligning two optical devices for transferring light energy therebetween, comprising the steps of:

positioning a mode size transformer on a submount with a groove;

positioning a first optical device having a first modal profile on the submount having a groove;

aligning the first optical device with the transformer by sliding one of the first optical device and transformer along the groove, the transformer comprising a tapered waveguide section having a smoothly varying cross sectional area;

positioning a second optical device having a second modal profile on the submount; and

aligning the second optical device with the transformer by sliding one of the second optical device and transformer along the groove.

2. The method of claim 1, further comprising the steps of:

receiving light energy from the first optical device with the transformer;

transforming the light energy from the first modal profile to the second modal profile; and

propagating the light energy to the second optical device.

3. The method of claim 2, wherein the step of transforming the light energy, further comprises the steps of:

receiving the light energy at a first end of a tapered waveguide section having a first cross sectional area;

propagating the light energy along the tapered waveguide section having a variable cross section;

sending the light energy through a second end of the tapered waveguide section having a second cross sectional area substantially greater than the first cross sectional area.

4. The method of claim 1, further comprising the step of propagating light energy from the first optical device through a waveguide of the transformer to the second optical device.

5. The method of claim 1, wherein the step of aligning the first optical device with the transformer further comprises the step of positioning a longitudinal centerline marker of the first optical device over the groove.

6. The method of claim 1, wherein the step of aligning the first optical device with the transformer further comprises the step of positioning a clad stripe within the groove.

7. The method of claim 1, wherein the step of aligning the first optical device with the transformer further comprises the step of aligning a fiducial mark on the first optical device with a fiducial mark on the submount.

8. The method of claim 1, wherein the step of positioning the first optical device having a first modal profile on the submount further comprises the step of positioning a laser diode to the submount.

9. The method of claim 1, wherein the step of positioning the second optical device having a second modal profile on the submount further comprises the step of positioning an optical fiber within the groove of the submount.

10. A method for fabricating a mode size transformer, comprising the steps of:

selecting a planar substrate;

applying a mask with a first shape to the substrate;

exposing the planar substrate to a ion solution;

applying an electric field to the planar substrate; and

forming a waveguide within the substrate by replacing ions of the planar substrate with ions of a metal via diffusion.

11. The method of claim 10, further comprising the steps of:

determining if the metal ions have reached a first predetermined depth;

in response to the metal ions reaching the first predetermined depth, stopping the diffusion of the metal ions and replacing the first mask with a second mask.

12. The method of claim 11, further comprising the steps of:

determining if the metal ions have reached a second predetermined depth;

in response to the metal ions reaching the second predetermined depth, stopping the diffusion of the sodium and metal ions.

13. The method of claim 10, wherein the step of applying the mask further comprises the step of exposing a first portion of a waveguide to be formed in the planar substrate.

14. A mode size transformer comprising:

a planar substrate; and

an optical waveguide disposed in the planar substrate, the optical waveguide comprising a tapered section, the tapered section comprising a smoothly varying cross sectional area.

15. The mode size transformer of claim 14, wherein the tapered section comprises rounded portions disposed within the planar substrate.

16. The mode size transformer of claim 14, further comprising a clad stripe attached to the waveguide and the planar substrate.

17. The mode size transformer of claim 14, wherein the planar substrate comprises one of silica and glass.

18. A system for passively aligning two or more optical devices, comprising:

a submount having a groove;

a first optical device with a first modal profile and positioned adjacent to the submount;

a second optical device with a second modal profile and positioned adjacent to the submount;

a mode size transformer positioned adjacent to the submount, for matching the first modal profile to the second modal profile, the mode size transformer comprising:

a planar substrate; and

an optical waveguide disposed in the planar substrate, the optical waveguide comprising a tapered section, the tapered section comprising a smoothly varying cross sectional area.

19. The system of claim 18, wherein the groove has a V-shape.

20. The system of claim 18, further comprising one of a centerline marker disposed on one of the optical devices and fiducial marks disposed on the transformer and the submount.